Duke University
DURHAM, NORTH CAROLINA
27708-0228

DIVISION OF EARTH AND OCEAN SCIENCES
NICHOLAS SCHOOL OF THE ENVIRONMENT
AND EARTH SCIENCES
BOX 90228

www.env.duke.edu/psds
TELEPHONE (919) 684-4238
FAX (919) 684-5833

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Chairman Gilchrest and members of the Subcommittee on Fisheries and Oceans, my name is Andrew Coburn, and I am Associate Director of the Duke Program for the Study of Developed Shorelines, commonly known as PSDS. It is an honor to appear before you today to present my views on H.R. 3552 (the Coastal Barrier Resources Reauthorization Act) and other federal coastal environmental management issues, programs and policies.

PSDS is an applied, interdisciplinary coastal environmental management research and advocacy program housed in the Duke University Nicholas School of the Environment and Earth Sciences. Under the guidance and direction of Dr. Orrin H. Pilkey, James B. Duke Professor Emeritus of Geology, PSDS takes a multidisciplinary approach towards identifying and solving diverse coastal resource management issues of national significance. We serve as an expert coastal policy, planning and technical resource; data repository and advocate for the responsible management of our nation's natural coastal resources.

On a personal level, I possess thirteen years professional interdisciplinary coastal environmental management experience and am considered an expert in a diverse array of coastal management disciplines including hazard identification and mitigation, coastal planning, land use planning, coastal policy, coastal storm impacts and coastal development. I have served on the North Carolina State Emergency Response Team (SERT), North Carolina Barrier Island Planning Advisory Panel, North Carolina Coastal Science Panel, North Carolina Coastal Caucus and NOAA Beach Nourishment Steering Team. I have completed eight post-storm aerial impact assessments - including Katrina - and over twenty on-the-ground storm damage assessments, and helped develop an innovative methodology used at Duke to identify and mitigate coastal hazards.

If there is one thing this committee should take away from today's testimony, it is that coastal barrier shorelines are neither damaged, nor threatened, by natural coastal processes such as hurricanes, tropical storms, nor'easters, shoreline retreat (beach erosion) or sea level rise. They never have been, and never will be.

Coastal barrier shorelines are resilient, flexible, ever-changing geomorphic features that, since the beginning of time, have been freely reacting to, and changing as a result of, natural processes without restraint or incident. In fact, the natural evolution of coastal barriers is entirely dependent upon storms, and storm processes allow coastal barriers to respond to sea level rise.

PSDS staff has visited over a thousand beaches, hundreds of developed and undeveloped coastal barriers and has completed dozens of aerial and on-the-ground post-storm reconnaissance assessments. It is our professional opinion that the real threat to our nation's coastal barrier shorelines comes not from any natural process or storm event, but from irresponsible economic development and an egoistic fervor to protect it at all costs.

Along undeveloped shorelines, the impacts of hurricanes, tropical storms, nor'easters, shoreline retreat (beach erosion) and sea level rise are benign. Except for a handful of coastal geologists, society cares nothing about undeveloped shorelines. How many articles have been written, or news reports aired, about the impacts of Katrina on the shorelines of Cat, Ship or Petit Bois islands?

Along shorelines lined with vacation homes, investment properties, condos, sewer systems and other human economic trappings, however, the changes brought about by natural coastal processes is a problem. But it is a perceived problem because the real problem lies in the fact that static structures and infrastructure have been placed in an environment that is among the most dynamic, most powerful and most unpredictable on earth. If there was no development along coastal barrier shorelines, there would be no problems.

The distinction between the problem (irresponsible coastal development) and the perceived problem (natural coastal processes) is a critical one because federal and state policies, plans and strategies that address the latter are nothing more than specious attempts at solving a problem that doesn't exist. This misperception is important for two reasons: 1) Policies that are erroneously focused on shorelines have significant economic and environmental impacts, and 2) The real problem is being ignored.

In theory, the easiest and best way to solve the nation's coastal development problems is simply to prevent construction in high-hazard areas, including coastal barriers. In reality, however, such a policy could never exist. While the federal government may not have the authority to stop bad development, it does have the authority to reduce or restrict Federal actions believed to encourage development in certain undeveloped coastal barrier areas.

And that's exactly what it did in 1982 when Congress passed the Coastal Barrier Resources Act (CBRA) and again in 1990 with passage of the Coastal Barrier Improvement Act (CBIA). With the creation of the CBRA and CBIA, Congress officially took the position that "an ounce of prevention is worth a pound of cure." Benjamin Franklin certainly would have been pleased.

According to the US Fish and Wildlife Service (USFWS), the objectives of the CBRA are:

A. To minimize loss of human life
B. To minimize wasteful expenditure of Federal revenues; and
C. To minimize damage to fish, wildlife, and other natural resources by restricting future Federal expenditures and financial assistance that has the effect of encouraging development of coastal barriers.

The CBRA and CBIA attempt to achieve these objectives by limiting financial assistance and the expenditure of federal funds for loans, grants, guarantees, insurance payments, rebates, subsidies or any other form of direct or indirect Federal assistance within the CBRS. Some notable CBRA impacts include:

- A savings to U.S. taxpayer of $1.3 billion through 2010 (USFWS)
- Does not limit private property rights (federal subsidies for development are a privilege, not a right)
- A potential model for the removal of federal subsidies that encourage other environmentally destructive practices
- The federal taxpayer does not subsidize hazardous development within the CBRS

While we support reauthorization of the Coastal Barrier Resources Act without hesitation, we are also obligated to state that the CBRA is not a panacea for solving the nation's coastal development problems. Positive benefits notwithstanding, the Act has limitations that can seriously reduce it's intent and overall effectiveness.

One problem with the CBRA is that it contains a number of vague exceptions, including:

1. Any use or facility necessary for the exploration, extraction or transportation of energy resources which can be carried out only on, in, or adjacent to coastal water areas because the use or facility requires access to the coastal water body;
2. The maintenance of existing channel improvements and related structures, such as jetties and including the disposal of dredge materials related to such improvements;
3. The maintenance, replacement, reconstruction or repair, but not the expansion, of publicly-owned or publicly-operated roads, structures, or facilities that are essential links in a larger network or system;
4. Military activities essential to national security;
5. The construction, operation, maintenance, and rehabilitation of Coast Guard facilities and access thereto; and
6. Expenditures that are allowable for specific actions or projects - provided that the actions or projects are consistent with the purposes of CBRA. Examples include research, emergency assistance and protection of fish and wildlife resources and their habitats.

The ambiguity of these exceptions is a big concern because they are ripe for misinterpretation. After Hurricane Fran made landfall in September 1996, for example, a significant amount of federal disaster assistance flowed into CBRS units along the North Carolina coast. Although technically prohibited, the distribution of federal post-disaster funds within the CBRS was justified by several different federal agencies in different ways. The end result was a belief among current and future property owners that the federal government would act similarly after future storms, thereby fundamentally nullifying the intent of CBRA.

Another deficiency of the CBRA is that it does not discourage private financing and development, nor does it discourage public expenditures of state or local funds within the CBRS. Just as the federal Coastal Zone Management Act requires federal actions to be consistent with state and local coastal policies, the CBRA should require non-federal public entities to abide by

the intent of the CBRA by reducing or restricting actions that encourage development on high-hazard coastal barriers.

We believe Congress should defer to the judgment of the USFWS when making changes to CBRS boundaries. Political pressure has allowed changes to be made to system boundaries by landowners interested in getting out from under CBRS restrictions. USFWS has shown a willingness to support legitimate corrections to systems boundaries and should have the clear authority to make such determinations based on accurate data.

But the biggest shortcoming of the CBRA is that it does little to address the problems caused by development that already exists on hazardous coastal barriers. While the prohibition on federal post-disaster expenditures is commendable, CBRA exceptions remain ripe for misinterpretation, and the intent of the law can easily be circumvented, especially after big storms when decisions are based more on emotion than reason. This will cause the CBRA to lose what little impact and benefit it has in this particular area.

In summary, I believe that the Coastal Barrier Resources Act has been, and will continue to be, a positive influence and valuable tool as we strive to deal with and mitigate the nation's coastal development problems, and we support reauthorization of the Coastal Barrier Resources Act without hesitation.

But the issues facing our nation's shorelines extend well beyond the boundaries of the CBRA and CBRS, and I would be remiss to end my testimony at this point without touching on what I feel are some of the nation's most critical coastal management problems, threats and challenges.

THE BIG PICTURE

It's only been a few weeks, but already the nation's collective memory of the destruction and misery wrought by Katrina, Rita, Wilma and Ophelia has begun to fade. They say time heals all wounds. It always does. How else can we explain society's inability to heed the lessons of previous storms?

Again and again, for over a hundred years, we have failed to learn what mother nature seems intent on trying to teach us: that we can't engineer nature; that the emplacement of development - houses, roads, condos and septic systems – along the shoreline is a bad idea and that it is pointless to spend billions of federal and state tax dollars to try and protect it.

The media focus this hurricane season has been on New Orleans, and deservedly so. But Katrina also overwhelmed virtually the entire Mississippi Gulf coast and devastated fifteen-mile-long Dauphin Island, Alabama - fifty miles east of where Katrina made landfall. I flew along the Mississippi, Alabama and Florida coastline four days after Katrina made landfall and witnessed, firsthand, the damage and destruction Katrina wrought along nearly 100 miles of Gulf coast shoreline (digital images are available online at http://www.nicholas.duke.edu/psds).

Katrina was a spectacular, but not unprecedented, event since Hurricane Camille did the very same thing in the very same place in 1969. Only Camille spared New Orleans. The impact to Dauphin Island, while stunning, is also not totally unexpected since Dauphin has been previously

flattened by Hurricanes Frederick (1979), Danny (1997), Georges (1998) and Ivan (2004). Frederic destroyed the only bridge to the island, but it was quickly replaced at a cost of $38 million. In the 1940s and again in the 1950s, wide inlets were cut across the island by unnamed storms.

Hurricane Ophelia, barely a category 1 hurricane, brushed along the North Carolina coast with none of the spectacular damage observed in Mississippi. But it removed a lot of sand from several artificial beaches that will cost taxpayers an estimated $14 million to replace.

We didn't hear too much about Rita and Wilma, for various reasons, but the damage from these hurricanes is likely well into the billions of dollars.

It's clear that the situation along our nation's developed shorelines has become dire, and that the long-term sustainability of natural coastal systems is being threatened. Not by natural coastal processes, but by coastal development and the proliferation of sort-sighted federal and state coastal policies and actions that favor the protection of buildings over the preservation of shorelines.

Leading this downward spiral is a small minority of special interests that include, among others, coastal property owners, coastal communities and the US Army Corps of Engineers. These groups routinely use flowery euphemisms like "beach preservation," "healthy beaches" and "beach nourishment" to garner public and political support for projects that stabilize beaches because, as we know, change is bad along developed shorelines.

But no beach ever needs preservation. If left alone, beaches will always be healthy and wide as they slowly retreat along with sea level rise. In other words, there is no problem until something is built next to the shoreline.

Artificially stabilizing migrating shorelines does more than not solve the nation's coastal development problems, it often exacerbates them. When shorelines are stabilized using hard structures such as concrete or stone walls or "soft" approaches such as beach dredge and fill (nourishment), rates of change can be accelerated and the degree of impact increased.

We have long since learned that if we build seawalls along eroding shorelines to protect buildings, beaches disappear. As a consequence, beach nourishment - the emplacement of sand on an eroding beach - has become the favored way to hold beaches in place. But nourishment comes with a whole new set of problems.

The lifespan of a nourished beach, for example, is unpredictable and can range from a few months to several years. Now consider that it costs between $1 and $10 million to put sand on just one mile of beach and nourishment looks more like a high-stakes gamble than a long-term solution.

Nevertheless, since 1965, over 800 nourishment episodes have taken place along the East and Gulf coast at a cost of nearly $2 billion. One project in Northern New Jersey cost $220 million for 21 miles, and a proposed project along 14 miles of beach along the NC Outer Banks is

estimated to cost $1.6 billion over 50 years. Last year, after four hurricanes struck Florida, state and federal taxpayers coughed up nearly $220 million – just to put sand back on state beaches.

Most of this is federal and state tax money, but all goes to protect the interests of a very small minority of affluent individuals who decided to purchase expensive property next to an eroding shoreline. Ophelia already removed a good chunk of Florida's new beaches in a matter of days. Wilma probably took away even more.

Suspiciously, one prominent special interest group, the American Shore and Beach Preservation Association, argues that what we need is nourishment for all beachfront communities in order to save lives and property (paid for by the federal government, of course). What the ASBPA fails to note, however, is that beach nourishment actually leads to intensified development, which, in turn, puts more people and property in danger. And the situation is only going to grow worse as the density of development increases, as the rate of shoreline erosion increases, as the frequency and intensity of big storms increases and as the availability of compatible sand dwindles.

Overall cost is one important economic factor in the debate over shoreline stabilization. The inequitable distribution of costs and benefits associated with shoreline stabilization projects is another.

When we assess storm impacts, we typically observe the majority of structural damage confined to the first one or two rows fronting the beach. According to CNN, 90% of all beachfront structures in the areas of Mississippi and Alabama affected by Katrina were completely destroyed. Based on my personal observation, I would agree with this assessment.

Compounding the fact that beachfront buildings suffer disproportionately high damage from winds and surf is the reality that shorelines are retreating back to the buildings, with or without storms. And the world's rising sea level is only going to intensify the problem.

Although property ownership patterns vary from state-to-state and county-to-county, we have concluded that only 3% of all beachfront properties in North Carolina serve as a primary residence (someone's permanent home). The remaining 97% of beachfront properties in North Carolina are investment properties, second homes or businesses. We can infer from this data that the overwhelming majority of public funds spent to stabilize shorelines is used to protect, and often significantly increase the value of, investments of those affluent enough to own beachfront property.

Compounding the economic disparity associated with protecting vulnerable coastal development is the growing problem of environmental degradation. In the past five years, we have seen a deteriorating beach scene where an increasing number of natural beaches are replaced by inferior quality sand, and projects in which sand is taken from places that, ironically, increase erosion rates.

- Poor quality sediment consisting of mud, rock and broken shell fragments has been used to stabilize miles of beach in Atlantic Beach, Pine Knoll Shores, Emerald Isle and Oak Island in North Carolina and Jacksonville Beach and Anna Maria Island in Florida.

- Even though mining sand from a natural inlet increases erosion rates on adjacent islands and may be the most environmentally damaging way to obtain nourishment sand, tidal inlets are now being coveted as a cheap source of beach sand. Erosion problems caused by inlet mining are already evident at Shallotte Inlet and will soon become apparent at Bogue Inlet, both in North Carolina.

Does any of this make sense? Why have Americans jammed their buildings up against shorelines that are retreating due to sea level rise and are impacted by storms that destroy buildings? One major reason is the support of the federal government. Beachfront property owners who tend to be politically powerful and whose buildings are almost exclusively cash cow rentals, are the recipient of federal flood insurance, nourished beaches, repeated storm clean-ups, publicly-maintained roads and bridges leading to their houses and support for infrastructure such as water and sewer.

LESSONS & RECOMMENDATIONS

There are many lessons to be learned from the 1-2-3-4 punch of Katrina, Ophelia, Rita and Wilma, but the most obvious – and most important - is that we must move back from the shoreline. Building structures next to an eroding shoreline can't be considered anything but societal madness. The nation needs to come to its collective sense about the future of development along our beaches and seriously consider retreating from eroding shorelines. Isn't protecting the quality of beaches for future generations worthy of drastic actions?

The most sensible thing from the standpoint of the federal taxpayer is for the federal government to take a hands-off approach and immediately halt all federal expenditures in this super-high hazard zone, both within and outside of the CBRS. The federal government should:

- Immediately halt federal support for shoreline stabilization efforts including beach dredge and fill projects (beach nourishment).
- Prohibit the reconstruction of damaged or destroyed buildings in high hazard areas.
- Help move, remove or demolish threatened buildings when their time comes.
- Investigate the feasibility of a national strategic coastal retreat policy.
- Establish an independent, objective, non-governmental technical committee to evaluate and rank high hazard coastal areas.
- Evaluate the possibility of building artificial sand dunes where buildings once stood at a fraction of the cost of beach nourishment. Not only would it be cheaper, but a dune affords more protection than an artificial beach.
- Require communities that do use public money to nourish beaches to prohibit the construction of beachfront highrises. Such buildings make response to the sea level rise impossible.
- Minimize the externalities of coastal property ownership by transferring the burden and placing the responsibility of owning hazardous beachfront property on property owners.

CONCLUSION

Does it make sense to continue rebuilding and rebuilding on coastal barriers? Does it make sense to rebuild any buildings on any barrier island after big storms using a huge influx of public money?

The immensely and undeniably unwise development that has occurred along our nation's shorelines could not have taken place without strong federal government support in the form of bridges, water and sewer lines, roads, insurance, repeated emergency recovery and now beach nourishment.

We understand the issues surrounding private property rights, but believe the federal government has a moral and legal obligation to protect and preserve the nation's public trust resources for future generations.

The view may be nice, but building next to a beach is highly irresponsible, and the federal taxpayer should not be asked to reward anyone who willingly chooses to own property next to an eroding shoreline subject to intense storms.

It is time for a new national policy to be formulated regarding coastal development in what is the most dangerous construction site in the world. Duke PSDS is uniquely qualified to assist in such an ambitious endeavor, and we stand ready to assist in any way possible.

Again, thank you for the opportunity to testify before this committee.